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Nuclear Business Unit

MAY 10 2000

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U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

LER 272/00-002-00
SALEM GENERATING STATION - UNIT 1
FACILITY OPERATING LICENSE NO. DPR-70
DOCKET NO. 50-272

This Licensee Event Report "Salem Unit 1 Manual Reactor Trip Due To Unexpected Rapid Turbine Load Drop" is being submitted pursuant to the requirements of the Code of Federal Regulations 10CFR50.73(a)(2)(iv). The attached LER contains no commitments.

Sincerely,

M. B. Bezilla
Vice President -
Operations

Attachment

/EHV

C Distribution
LER File 3.7

The power is in your hands.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information

FACILITY NAME (1)

SALEM UNIT 1

DOCKET NUMBER (2)

05000272

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TITLE (4)

Salem Unit 1 Manual Reactor Trip Due to Unexpected Rapid Turbine Load Drop.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
04	11	00	00	-002	- 00	05	10	00		
									FACILITY NAME	DOCKET NUMBER
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR II: (Check one or more) (11)			
POWER LEVEL (10)	100	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	X 50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)			

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
E. H. Villar, Licensing Engineer	(856) 339-5456

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

At 1054, on April 12, 2000, a manual reactor trip was initiated at Salem Unit 1 due to a rapidly decreasing main generator electrical output, while a circuit card in the Valve Position Limiter (VPL) portion of the Electrohydraulic Control (EHC) system was being replaced. This card replacement was being performed as an Infrequently Performed Test and Evolution (IPTE) utilizing procedure SC.IC-GP.EHC.0002 (Z), General Troubleshooting for Main Turbine EHC System. The EHC card was being replaced to correct a previously identified slow downward drifting of the VPL.

The apparent cause of the initial drifting of the VPL is attributed to induced signal noise being picked up by the EHC VPL circuitry. This noise was determined to be picked up by two unused wires within the control console push-button, which appeared to have been behaving as an antenna for noise. The cause of the reactor trip is attributed to the proper response by the licensed control room operator to the unexpected load drop following the replacement of the card. The apparent cause of the unexpected load drop has been attributed to a momentary power decrease on the Up/Down converter card while installing the 3QO2E2 card.

Corrective actions taken to correct the initial drifting problem and the sudden power decrease included the elimination of the two unused wires within the control console push-button, and the replacement of 3 EHC cards.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

PLANT AND SYSTEM IDENTIFICATION

Westinghouse – Pressurized Water Reactor

Turbine Electrohydraulic Control System {TG} (EHC)

Nuclear Instrumentation System {RI} (NIS)

Service Water System {P} (SW)

* Energy Industry Identification System {EIS} codes and component function identifier codes appear as (SS/CCC)

CONDITIONS PRIOR TO OCCURRENCE

Salem Unit 1 was in Mode 1 at 100% power prior to the reactor trip. Following the reactor trip, Unit 1 was stabilized in Mode 3. No structures, systems, or components were inoperable at the time of the occurrence that contributed to the event.

DESCRIPTION OF OCCURRENCE

At 1054, on April 12, 2000, Licensed Control Room Operators at Salem Unit 1 initiated a manual reactor trip due to a rapidly decreasing main generator electrical output, while a circuit card in the Valve Position Limiter (VPL) portion of the Electrohydraulic Control (EHC) system was being replaced. This card replacement was being performed as an Infrequently Performed Test and Evolution (IPTE), utilizing procedure SC.IC-GP.EHC.0002 (Z), General Troubleshooting for Main Turbine EHC System. The EHC card was being replaced to correct a previously identified slow downward drift of the VPL signal.

During the insertion of the new card into the slot, a rapid drop of turbine load occurred. At this time, the licensed control room operators manually tripped the plant based on exceeding a limit on turbine load, which had been established prior to the card replacement as part of the troubleshooting plan.

An auxiliary feedwater start was received due to low steam generator levels as a result of the normal shrink following a reactor trip. All safety systems performed as designed. Source range nuclear instrument N31 and the 14 service water pump were out of service at the time of the event. Source range nuclear instrument N32 and the other service water pumps performed as designed.

Operators responded properly to the event and the subsequent plant shutdown. The plant responded as expected. The unit was stabilized in Mode 3.

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ANALYSIS OF OCCURRENCE

Plant operators had previously noticed drifting of the turbine load in the downward direction. Operations, Maintenance and Engineering personnel suspected that the cause of the drifting was due to a malfunction of the EHC circuitry. Specifically, they suspected the 3QO2E2 card (part number 398673, manufactured by Westinghouse). Once the suspected card was identified, a detailed plan for the troubleshooting was developed and reviewed by the Station Operations Review Committee (SORC). The manufacturer was also contacted for concurrence that troubleshooting of this card could be conducted with the turbine on-line.

Because of the high risk perceived in the evolution, this activity was designated as an IPTE and a test manager was assigned to oversee the troubleshooting. The "General Troubleshooting Main Turbine EHC System" procedure was utilized. Replacement of the EHC card was expected to be accomplished without any significant movement of the VPL (turbine load) and, therefore, any significant VPL movement was to be terminated by manually tripping the unit. "Significant VPL movement" was determined to be a load drop below 900MWe. During the pre-job brief, the operators were instructed to trip the unit upon an unexpected load drop below 900MWe.

In accordance with the IPTE plan, the main turbine was placed in MANUAL MODE – IMP IN. The maintenance technician removed the 3QO2E2 card without any disturbances to the system. As the technician placed the new card in service, the plant experienced a rapid loss of load. Turbine load dropped from 97% to approximately 62%, which equated to a 35% power reduction. Licensed control room operators manually tripped the plant based on exceeding the previously established limit on turbine load.

CAUSE OF OCCURRENCE

The apparent cause of the initial drifting of the VPL was attributed to induced signal noise. This noise was picked up by two unused wires within the control console push-button, which appeared to have been behaving as an antenna for noise.

The cause of the reactor trip is attributed to the proper response by the licensed control room operator to the rapid load drop (in excess of established limits).

The apparent cause of the rapid turbine load reduction has been attributed to a momentary loss of 15 volts on the adjacent, 3QO2F2, VPL Up/Down counter 3 card (part number 398522, manufactured by Westinghouse). The 3QO2F2 card was found to have a bent pin at the 15-volt power position.

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CAUSE OF OCCURRENCE(continued)

Inadvertent technician contact in conjunction with the bent pin on the card resulted in the momentary loss of power with the ensuing rapid turbine load drop.

PRIOR SIMILAR OCCURRENCES

A review of 1998 and 1999 LERs for both Salem and Hope Creek identified no similar occurrences.

SAFETY CONSEQUENCES AND IMPLICATIONS

There were no safety consequences or implications associated with this event. All systems performed as designed to safely shutdown the reactor and maintain the reactor in a safe shutdown condition. The manual reactor trip was performed in accordance with the guidance provided during the pre-job brief. All safety systems performed as designed.

Although source range nuclear instrument N31 and 14 service water pump were out of service at the time of the event, source range nuclear instrument N32 and the remainder of the service water pumps performed as designed

A review of this event determined that a Safety System Functional Failure (SSFF) as defined in NEI 99-02 did not occur.

CORRECTIVE ACTIONS

1. The 3Q02E2 card was replaced, and satisfactorily tested. Additionally, the Up/Down Counter card, and a D/A converter 3 card, part number 398409, manufactured by Westinghouse, were replaced.
2. The two unused wires within the control console push-button were eliminated.
3. A root cause team was put in place to determine the cause of the sudden drop in load, which led to the manual trip of the reactor. Additional corrective actions may be taken as a result of the root cause team investigation. These actions will be tracked in the corrective action system.

COMMITMENTS

No commitments are made in this LER.